The Role of Pitch Accent in Discourse Construction

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Introduction

Linguistic communication by nature is a structured series of events. As people communicate with one another, it is not enough simply to process each statement independently of the rest. The utility of speech would be limited severely if communicative goals could not be carried out over a longer stretch than a single utterance. To surmount this problem, people deduce relationships between utterances in order to create a structured unit out of those utterances: a discourse. Take the following example: 'Don't put potatoes in the gumbo. Steve is allergic.' Imagine the consequences of interpreting these two utterances independently of one another. Ideally, the first requires justification, but without inferring that the following utterance serves this purpose, how could this demand possibly be met? In addition, interpreting the second utterance independently of the first leaves open two questions: What is Steve allergic to? Why is this important? This example illustrates that in order for speech to achieve a communicative goal, language users must establish relations between utterances in a discourse.

If discourse exhibits coherent structure, it follows that there must be a mechanism through which this structuring is achieved, for how can order come from chaos? If, in a discourse, participants arrive at a shared structural interpretation, then they must share strategies for inferring discourse structure. Uncovering the specifics of these strategies has several motivations. First, computational implementations of discourse structuring strategies can advance language-based machine-human interfaces for technologies such as automobile and aviation navigation, home security systems, automated online customer service, and language teaching tools. In addition, illuminating individual aspects of the adult discourse structuring mechanism provides the benchmarks for investigating the development of discourse construction skill in children. Finally, understanding the mechanism of discourse construction in humans can

contribute to the fields of cognitive science and animal science, as it provides insight into the nature of logical operations for communication that may or may not be language-dependent.

The present study advances knowledge of the discourse structuring mechanism by investigating the role of intonation in establishing contrastive discourse relationships. It examines the hypothesis that the accentual pattern of a discourse marker, a word or phrase that sets relations between utterances (e.g., 'And then'), plays an important role in the anticipation of contrast within a discourse. In particular, the experiment is designed to test whether a contrastive accent (L+H*) produced on a discourse marker evokes accentual patterns and informational focuses that mirror those of the immediately preceding utterances.

In the experiment, participants were presented with short discourses exhibiting various accentual patterns and were asked to continue the discourses as they deemed appropriate. This thesis reports the preliminary analysis of spontaneous utterances from twelve participants. In general, participants exhibited wide variation in the structure of their continuations. While some participants preferred to use a structure parallel to the immediately preceding sentence, others entertained various syntactic and informational structures to continue their stories. Although the accentual pattern of the discourse markers did not show the predicted uniform effect in evoking contrast in participants' spontaneous continuations, we found an interesting interaction between the prosodic pattern of the preceding sentence and the accentual pattern of the discourse marker in guiding the use of contrastive information. When the preceding sentence had a contrastive accent on the subject, participants mentioned a contrastive subject more often when the mediating discourse marker also had a contrastive accent than when it did not. On the contrary, when the preceding utterance exhibited a contrastive accent on the direct object of the verb,

participants produced a contrastive object relatively more often when the discourse marker did *not* have contrastive accent than when it did.

Two possible accounts for these results distinguish the function of contrastive accent at two different points during the discourse. Although these unexpected findings suggest a complex interaction between thematic and accentual structures during discourse construction, the present report is based primarily on the analysis of 'parallel' continuations, a subset of the collected spontaneous speech. The effect of accent on discourse structuring must be confirmed with a larger data set. In addition, we identify potential problems with the experimental design that may have made the contrast in the subject position more salient than in the object position, as well as problems with certain stimuli that likely led to biased responses from participants. Since participants' sensitivity to the accentual prominence in the discourse context was reflected in their spontaneous continuations despite the potential problems, this thesis provides a basis for a future investigation of how online processing of prosody mediates discourse structuring.

Discourse Markers

Among the frequently studied components of the discourse structuring mechanism under investigation are 'discourse markers' (DMs). Using the term 'cue phrases' (interchangeable with DMs), Hirschberg and Litman (1993) describe these components as 'words or phrases that directly signal the structure of a discourse' (p. 501). That is, they establish the relationships between the utterances with which they are associated and discourse context as a whole. These are often words or phrases that serve certain grammatical functions in some instances of use, but act as DMs in others. For example, 'now' acts as a temporal adverb in the following utterance: 'You want me to move that shelf? I can't do that now.' The same word acts a DM in a similar

context: 'You want me to move that shelf? Now, I can't do that.' Note that while 'now' literally refers to the current point in time in the first example, it does not in the second. Rather, it relates the speaker's refusal to the listener's initial request. DMs are used in this way and many others to signal the information structure that provides coherence to a group of utterances. While they do not contribute to the semantic meaning of an utterance, they do indicate its communicative or pragmatic function, placing it in relation to the other utterances within the discourse.

Through extensive sociolinguistic fieldwork, Schiffrin (1987) established many of the more common uses of certain DMs, including expressions such as 'oh' and 'well,' conjunctions such as 'and,' 'but,' and 'or,' and even adverbs such as 'now' and 'then.' For example, in her analysis of 'and', she found its use to be twofold: to 'coordinate idea units' and to 'continue a speaker's action' (p. 128). In other words, 'and' serves to connect utterances serving parallel discourse functions (e.g., support for a single claim) as well as to indicate a speaker's intention to add statements about consecutive events. In her analysis of 'now,' she found its DM use to indicate speaker progression 'by displaying attention to an upcoming idea unit, orientation, and/or participation framework' (p. 230). Simply put, 'now' is often used to mark a speaker's advancement through the various topics and subtopics of a discourse as well as to indicate a shift in the speaker's and/or listener's view of what is being said. She also notes that the distinction between the grammatical and DM uses of 'now' sometimes can be blurred, such as in the statement, 'They used t'keep them trimmed. Now for us to do that…' (p. 231). In this instance, 'now' may refer to the current point in time, or it may indicate a progression from the topic of others trimming to that of the speaker trimming. Schiffrin notes that prosodic information is often used in making distinctions between grammatical and DM usages in situations such as these. For example, placing a pause after 'now' may indicate a DM usage (e.g., 'Now <pause>

for us to do that…'), while producing 'now' with intonational prominence and no pause may indicate a grammatical usage (e.g., 'NOW for us to do that…). In order to utilize these prosodic distinctions, participants in a discourse must understand the ways in which prosodic contours can convey distinctive meaning; that is, they must share the phonological structure and associated meanings of intonational patterns. The following section provides a brief review of a current theory of the intonational phonology of American English.

Intonation Structure and Meaning

Following the breakthrough work on the intonation system of American English by Pierrehumbert (1980), most current theories of intonation of various languages have been developed on the notion of a hierarchical structure of prosodic phrasing. The ToBI (Tones and Break Indices) framework, developed at The Ohio State University, is one of today's wildly used systems for prosodic annotation that shares this assumption (Beckman, Hirschberg, & Shattuck-Hufnagel, 2005). The largest prosodic unit in the ToBI framework is called the Intonational Phrase (IP). An IP consists of at least one intermediate phrase (ip), and its right edge is marked by a boundary tone (L% or H%, where L and H indicate abstract target pitch height). The ip consists of at least one pitch accent, and its right edge is marked by a phrase accent (L- or H-). The pitch accent is the local prosodic prominence within an ip expressed through changes in fundamental frequency (f0) during the stressed syllable of the accented word. Pitch accents can take many forms, determined by the nature of the f0 excursion and the placement of the excursion relative to the stressed syllable. According to the current ToBI system for American English, pitch accents include L* ('low star'), H* ('high star'), L*+H ('low star plus high'), L+H*, H*+L, and H+L*, where L and H also indicate relative pitch height, and * indicates

which portion of the excursion, high or low, aligns with the lexically stressed syllable. Furthermore, the system includes break indices, which range from zero to four and indicate the level of disjuncture between individual words. The current ToBI homepage at http://anita.simmons.edu/~tobi/ provides a useful tutorial complete with audio samples of many intonational contours.

Intonation can carry with it a variety of discourse-level meanings. Pierrehumbert and Hirschberg (1990) provide a detailed analysis of the various pragmatic functions of certain contours. They note that while stress patterns are determined by lexical-phonological rules and serve to make certain syllables perceptually more prominent than others, accentual patterns (i.e., accents and tones) serve as an indication of information structure within discourse. For example, they propose that the H* pitch accent indicates that the accented information is new to the discourse and should be added to the 'mutual belief space' of the listener, while L* indicates that the accented information is uncertain and should not necessarily be added to this mutual belief space. L+H*, which is the focus of this thesis, is claimed to evoke contrast among discourse entities. For example, the L+H* on 'December' in 'It's awfully warm for January. It's even warm for *December*' (Pierrehumbert & Hirshberg, 1990: p. 296; italics added to indicate L+H*) serves to contrast that month with January. Note that the categorical distinction between H* and L+H* has been subject to controversy due to the overall similarities in their contour shapes and to the gradient nature of their pitch excursions (Liberman & Pierrehumbert, 1984; Pierrehumbert & Steele, 1989; Ladd & Morton, 1997; Ladd & Schepman, 2003). On one hand, speakers are capable of reproducing the subtle gradient changes in pitch range in an auditory prompt (Liberman & Pierrehumbert, 1984) and they can also gradually increase the level of pitch range along with the level of emphasis (Arvaniti & Garding, in press) while listeners are not capable of

discriminating among accents with somewhat subtle pitch differences, even across a putative discrimination boundary suggested by identification task performance. These results seem to suggest non-categorical distribution of accentual pitch excursions. On the other hand, speakers are able to produce distinctive pitch excursions when they need to convey contrastive messages (Ito, Speer & Beckman, 2003; Ito & Speer, 2006), and listeners are capable of assigning emphatic pragmatic meaning to tunes in a categorical manner (Ladd & Morton, 1997). Using synthesized stimuli exhibiting a gradual increase in pitch range, Ladd and Morton applied the classical categorical perception paradigm from Liberman, Harris, Hoffman, and Griffith (1957) to investigate the categorical nature of 'normal' versus 'emphatic' accent, and they found a sharp division between the two interpretations. This study suggests that while listeners may not be able to detect subtle differences in f0 excursion, they nevertheless are predisposed to assign categorical interpretations to accentual contours.

In addition to the pragmatic function of pitch accents, phrase accents and boundary tones jointly contribute to the pragmatic meaning of utterances. Pierrehumbert and Hirschberg (1990) propose that phrase accents serve to indicate interpretive boundaries: H- indicates that the following ip is part of the same interpretive unit, while L- indicates the opposite. For example, 'apple' in 'Do you want an apple or banana cake?' may be followed either by a H-, L-, or no phrase accent (p. 303). In the no phrase accent condition, the question can be interpreted as one about two types of cake: apple or banana. With a phrase accent following 'apple', the question can be taken to mean that there is an apple and a banana cake. The H- indicates that together the apple and the banana cake make up the single interpretive unit of all available choices. Conversely, the L- places an interpretive break between the two items, suggesting that other choices may also be available. In regard to boundary tones, Pierrehumbert and Hirschberg

propose that H% leads to the interpretation of the IP in relation to an upcoming phrase, while L% does not induce such an interpretation. In addition to these stated functions, phrase accents and boundary tones are combined in various ways to obtain further pragmatic specifications, such as in the case of L-H%, which is often called the 'continuation rise' and is used to indicate the intention to continue speaking. In this realm, Hirschberg and Ward (1992) investigated the perception of the rise-fall-rise contour (L*+H L-H%) in American English and found that variations in f0 range and spectral characteristics differentiated between the categorical interpretations of uncertainty and incredulity. Taken together, these studies show that just as with pitch accents, entire phrasal tunes, though gradient in production, induce categorically distinct pragmatic interpretations of the utterances on which they are produced.

Intonation and Discourse Comprehension

Parallel to the development of phonological analyses of intonational systems, numerous psycholinguistic studies have demonstrated the effect of intonation on discourse comprehension. Utilizing a simple comprehension time paradigm, Bock and Mazzella (1983) presented subjects with sentence pairs in which the accentual pattern of the second sentence (target) was held constant while the first varied between subject accent, verb accent, and no accent. They found the fastest comprehension times for target sentences when the placement of accent in the first sentence was appropriate given the accent in the target (e.g., 'ARNOLD didn't fix the radio. DORIS fixed the radio.'). In fact, the average comprehension time in this condition was shorter than the duration of the target sentence itself. The authors take this to suggest that 'the appropriate use of intonation to mark information structure facilitates the comprehension of sentences' (p.72). Such intonational facilitation of discourse comprehension has been shown

repeatedly across languages (English: Birch & Clifton, 1995; Dutch: Nooteboom & Terken, 1982; Japanese: Ito, 2002).

While the above studies confirm the robust effect of intonation on discourse comprehension by means of offline measurements such as sentence verification or discourse consistency judgment, more recent studies have demonstrated the immediate effect of intonation with online observation of eye movements. For example, Dahan, Tanenhaus and Chambers (2002) tested listeners' responses to accentual manipulation on object nouns with a monitor-based object-relocation task and showed that accentual prominence was interpreted non-anaphorically, (i.e., listeners fixated unmentioned objects), whereas lack of accent led to anaphoric interpretation, resulting in fixations to already-mentioned objects.

Ito and Speer (in press) analyzed eye movement data obtained from an instructed visual search task in which subjects searched a grid of colored objects sorted by object type. When contrastive L+H* was used felicitously (e.g., 'Hang the blue ball. Next, hang the GREEN ball.'), subjects made anticipatory fixations on the repeated target (ball) before the lexical content of the head noun was fully processed. Similarly, when L+H* was used infelicitously (e.g., 'Hang the blue ball. Next, hang the GREEN star.'), subjects made incorrect fixations on the previously mentioned target (ball) before they fixated the correct target (star). Based on these results, Ito and Speer argue that accentual information is processed immediately upon perception, so that L+H* on the color adjective in the second instruction evoked a notion of within-object color contrast, which then led to anticipatory eye movements to the previously mentioned object cell.

Implementing the same task, Ito and Speer also tested the effect of L+H* on the DM introducing the next instruction. They predicted that L+H* would induce an expectation of upcoming contrast, and due to the nature of the task - searching ornaments sorted by object type -

the data should exhibit anticipatory fixations on the previously mentioned portion of the grid before the color adjective is processed. Contrary to this hypothesis, they found no anticipatory fixations when L+H* was produced on the DM, which they attribute to subjects' uncertainty regarding the nature of the upcoming contrast (color vs. object contrast). However, when L+H* was used felicitously on the color adjective (e.g., blue drum → GREEN drum), the decline in fixations to the target was much sharper when the DM had L+H* than when it had H*. The authors take this to indicate that L+H* on the DM did evoke a notion of upcoming contrast, and when L+H* on the color adjective confirmed this expectation, subjects were able to switch attention more quickly to the following task than when the DM did not exhibit L+H* and thereby made the L+H* on the color adjective an initial indication, not confirmation, of contrast.

The current study intends to expand upon the above findings by testing the effect of L+H* on DMs in a situation in which L+H* in prior context indicates upcoming contrast. When a specific part of contextual information is highlighted accentually, L+H* on a following DM may facilitate the construction of a contrastive message for an upcoming utterance. For example, when a discourse involves two people, and one of them is highlighted as the agent of an action, the following sentence may mention with intonational prominence the act of the other person. See the example below:

(1) Before hanging the new curtains, **Lara** and **Brian** decided to clean the living room. First, **LARA** opened the window. And **THEN**,

…BRIAN vacuumed the floor.

In the above discourse, L+H* on the DM 'then' may prompt the upcoming contrast completion with 'Brian' accented with L+H*. Here, the parallel information structures of the two sentences are linked through accentual prominence.

Alternatively, L+H* on 'then' may prompt the contrastive action of the already highlighted agent. In this case, the above discourse may continue with a pronoun:

(2) …she **VACUUMED THE FLOOR**.

Another possibility (among many others) is that L+H* on a DM prompts a 'reset' of the discourse unit (i.e., suggests the change of discourse topic). Although it seems less likely, the above discourse could be continued with:

(3) …a pigeon flew into the room.

Since most of the past work on DMs has been based on partially transcribed conversation pieces experienced by the researchers, it is difficult to analyze the function of DMs and the effect of their accentual patterns against the full context in which they are situated. To examine whether the accent on a DM has any systematic contribution to discourse structuring, an experiment was designed utilizing a simple discourse continuation task.

Experiment

Investigating the effect of intonation on natural discourse structuring requires collection of spontaneous responses within controlled discourse contexts. The current study employed a discourse continuation task in which participants listened to short discourses and provided brief continuations according to what they felt would be likely a or appropriate extension of the

discourse. The discourses consisted of two sentences followed by a DM and exhibited systematically varied L+H* placements in both the second sentence and the DM (see *Materials* below). It was hypothesized that L+H* on a DM evokes a notion of contrast between the immediately preceding utterance and the upcoming utterance, such that the locus of prosodic and informational prominence in the upcoming utterance mirrors that of the preceding utterance. Thus, the prosodic and informational structures of participants' continuations were expected to be more predictable from the prior context in the presence, than in the absence, of L+H* accent on the DM.

Materials

Forty-eight short discourses were prepared as target stimuli. Each trial consisted of a three-part auditory prompt. The first sentence introduced a broad context of each discourse, presenting two people (male & female) engaged in some naturalistic situation (e.g., 'This spring, Mary and Adam finally started gardening.' All items are provided in the Appendix). These initial context sentences (labeled as 'Context') introduced either a collaborative situation in which the two people intend to achieve a common goal (as in the above example), or companionship for an event (e.g., 'While hiking through the woods, Judd and Louise came upon a beautiful sight.'). Out of forty-eight items, nineteen were judged as 'Collaborative', twenty-two were 'Companionship' and seven were labeled as 'Companionship with Potential Collaborative Act' (e.g., 'When the power went down, Julie and Ben were cooking dinner.'). These types of Contexts were used so that participants could easily provide brief continuations without significantly deviating from the discourse context. Male and female names were used to avoid the potential ambiguity of pronoun usage in the participants' responses. In half of the items the

male name appeared first while the other half had the female name first. No name reappeared across items.

The second sentence (labeled as 'Prompt') presented an action performed by one of the two aforementioned people (e.g., 'Early on, Mary planted basil.'). All of these sentences had a simple SVO syntactic structure. The direct object was a discourse entity that was naturally inferable from the preceding context (e.g., gardening → basil). The accentual pattern of the main SVO clause was altered systematically. It followed either one of the three intonation patterns below:

(4) Mary planted basil.

H* !H* L-L% (H* on the subject, !H* on the object noun)

(5) MARY planted basil.

L+H* L-L% H* L-L% (L+H* on the subject, H*on the object noun)

(6) Mary planted BASIL.

H* L+H* L-L% (H* on the subject, L+H* on the object noun)

The accentual pattern of the prompt was manipulated to test whether the information structure of a participant's continuation and its arguments' prominence are directly linked to those of the immediately preceding utterance and if they are mediated or modified via the prosodic properties of the DM.

As for the last auditory stimuli, four DMs, 'And then', 'And next', 'Following that', and 'After that', were cycled through the target trials. The DM was presented with either L+H* or H* on the second word, followed by L-H% that prompted the continuation:

(7) And THEN or And then

L+H* L-H% H* L-H%

Each of these four DMs is assumed to prompt an event contiguous to the action described by the immediately preceding sentence. Note that the word 'then' is often used as a DM that introduces a parallel idea or event (e.g., 'He had cases, and then I had two.' See Schifrin (1987) for detailed discussion of 'then'). However, because it was always presented with a pitch accent (either L+H* or H*) in an isolated Intonational Phrase, we expected that participants would interpret the DM with 'then' as a temporal DM indicating a progressive event (Hirschberg & Litman, 1993).

Crossing the three accentual patterns of the Prompt sentences with the two accentual patterns of the DM yielded six 'Prompt → DM' sequences. Employing a Latin Square design, six lists of target trials were generated such that each of the six conditions was presented in eight trials within each list, and each of the forty-eight discourse items appeared once in all six conditions across the lists. Table 1 summarizes the six combinations of accentual patterns for the 'Prompt → DM' sequence, and Table 2 provides examples of each of the six conditions presented in Table 1.

	DM1 (L+H*)	DM2 (H*)
Prompt1 (H* !H*)	C1	C2
Prompt 2 (L+H* H*)	C3	C4
Prompt 3 (H* L+H*)	C5	C6

Table 1: Experimental conditions (subject and object accent type in parentheses)

Condition	Prompt	DM
C1	'Early on, Mary planted basil.'	'And ***NEXT***…'
C2	'Early on, Mary planted basil.'	'And next…'
C3	'Early on, ***MARY*** planted basil.'	'And ***NEXT***…'
C4	'Early on, ***MARY*** planted basil.'	'And next…'
C5	'Early on, Mary planted ***BASIL***.'	'And ***NEXT***…'
C6	'Early on, Mary planted ***BASIL***.'	'And next…'

Table 2: Prompt accentual patterns of conditions 1-6 (L+H* indicated by bold italics) after a Context: 'This spring, Mary and Adam finally started gardening.'

In C1 and C2, no specific argument was prosodically highlighted in the Prompt, allowing for comparison between the two conditions to test the effect of presence or absence of accentual prominence on the DM. It was predicted that participants might produce a wide variety of continuations under C2, assuming that a frequent syntactic construction such as SVO has a relatively weak effect of structural priming (Bock & Griffin, 2000). If the presence of L+H* on the DM is a strong enough cue to upcoming contrast, responses in C1 may be biased, yielding more utterances in a syntactic and informational structure comparable to that of the Prompt. In C3 and C4, accentual prominence was placed on the subject of the Prompt. If L+H* in the subject position is a strong enough cue to contrast, as suggested by Bock and Mazzella (1983), participants should produce utterances with the alternative agent from the Context in the subject position more often under these conditions than in the other conditions. The presence of L+H* on the DM in C3 may strengthen this tendency. Finally, C5 and C6 exhibit L+H* accent in the object position. Again, if participants are sensitive to this accentual cue, they may produce more

utterances with a prominent object that can stand in contrast to the accented entity within the discourse context, and this tendency may be strengthened by the presence of L+H* on the DM in C5.

In addition to the target items, forty-eight filler items were constructed. These items exhibited twenty-four intransitive structures and twenty-four dative structures (half double-object and half prepositional), and L+H* placement included subject, direct object, indirect object, and verb placement. The fillers were dispersed evenly throughout each list so that no experimental condition and no more than two target items were presented consecutively. This was done to introduce variation intended to avoid repetitive priming effects on participants' responses. Furthermore, half of the filler items exhibited 'however' as the DM in order to introduce a non-temporal DM, thereby making participants attend to the meaning of the DM in each trial in order to produce a pragmatically appropriate response.

Auditory Stimuli

The stimuli were recorded in Praat at a sampling rate of 22050 Hz with a female native English speaker trained in producing ToBI-annotated intonational contours. The accentual patterns of the auditory stimuli were annotated by another trained ToBI transcriber who was unfamiliar with the experimental design in order to ensure that all accentual patterns were appropriate for the experimental purposes. Any recordings that did not match the desired accentual pattern were re-recorded. The number of re-recordings necessary was very small (only three DMs)[1]. Figure 1 presents sample f0 contours and the ToBI annotations of the three Prompt

[1] Some Prompt 1 sentences were transcribed with L+H* on the subject. These were analyzed by a qualified third party to determine whether they induced the same pragmatic interpretation as the L+H* in subject position in Prompt 2, and it was determined that they did not. Though some of the accents on the subject in Prompt 1 (which were meant to be H*) exhibited a slightly steeper rise to the f0 peak than the other H*s, they were pragmatically

variations ('…Mary planted basil'). Figure 2 shows the example f0 contours and ToBI labels for the two DM variations. Table 3 lists the average duration and f0 value of the subject and object in the three Prompt variations, and Table 4 lists these averages for the two DM variations.

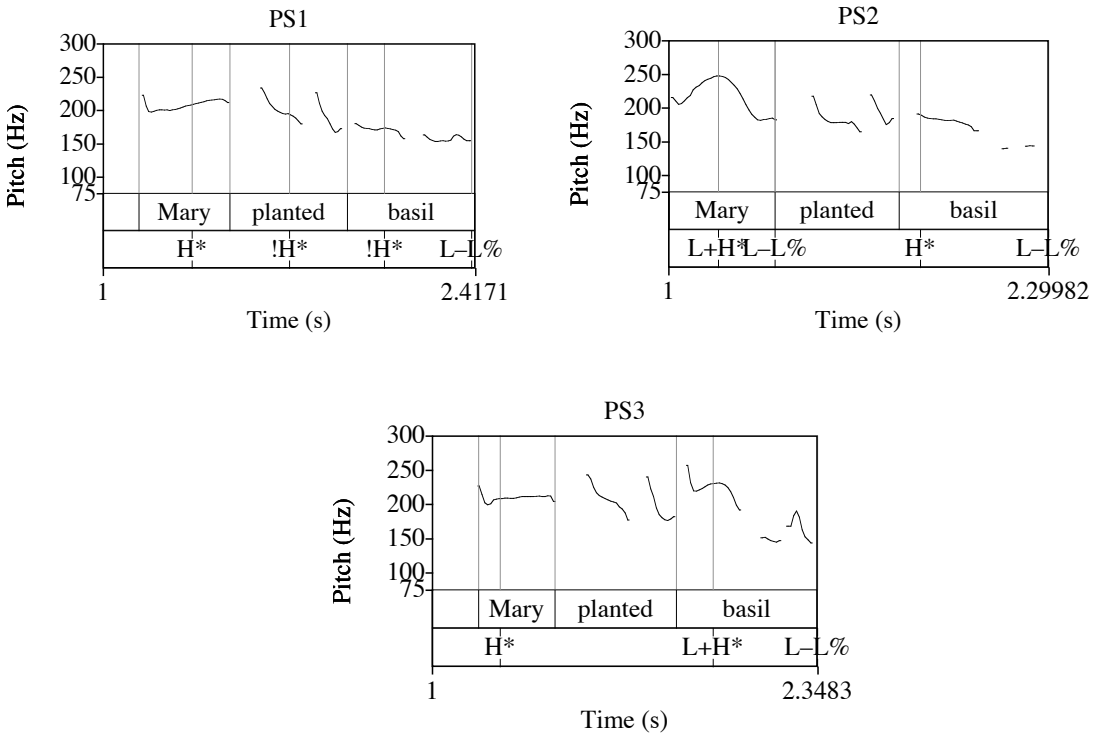

Figure 1: Example pitch contours of the three Prompt variations (labeled PS1-3)

interpreted as not indicative of contrast, but rather of normal emphasis associated with the subject of a declarative statement. Recalling the results of Ladd and Morton (1997), a certain amount of variation in f0 range is possible while still attaining the pragmatic interpretation intended by the speaker. We assumed that the small fluctuation in the f0 range among Prompt 1 items would not lead to contrastive interpretation in participants.

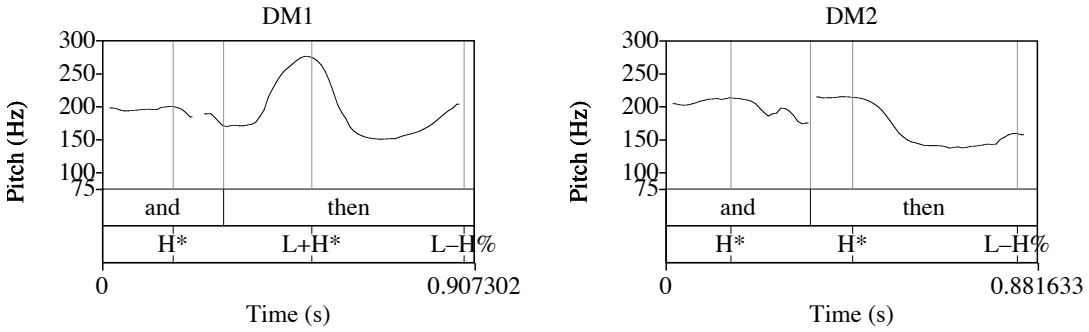

Figure 2: Example pitch contours of the two DM variations

Prompt # & Accentual Type	Subject		Object	
	duration (ms)	f0 (Hz)	duration (ms)	f0 (Hz)
Prompt 1 H* !H*	332	201	537	162
Prompt 2 L+H*L-L% H*	352	219	543	173
Prompt 3 H* L+H*	319	203	607	198

Table 3: Average duration and f0 value of subject and object for Prompt variations

DM Accent	1st word (e.g., 'and')		2nd word (e.g., 'then')	
	duration (ms)	f0 (Hz)	duration (ms)	f0 (Hz)
L+H*	381	193	593	206
H*	395	209	499	176

Table 4: Average duration and f0 value of each word for DM variations

Procedure

Each list was divided into three blocks of thirty-two items apiece in order to give participants two mid-experiment breaks as well as to avoid any total data loss should the recording have malfunctioned. The first block of each list began with three filler items to allow participants to familiarize themselves with the procedure before responding to target trials. The subsequent two blocks began with two filler items in order for participants to reacquaint themselves with the procedure. Participants were instructed to listen to the short discourses carefully and then to respond with what they felt was a likely continuation of the discourse given what they had heard. In the instructions, no mention was made of information structure, intonation, or DMs. The entire session lasted approximately one hour.

Stimuli presentation was done through EPrime Version 1.2. Participants were seated in a soundproof booth and were presented the stimuli using a Dell Optiplex GX620 computer over Dell AS501 monitor speakers. They advanced through each utterance (i.e., Context, Prompt, DM) using a Psychology Software Tools serial response box, and they were able to repeat both the Context and Prompt as many times as needed. After hearing the DM, participants saw the written prompt 'Continue the story as you like' on the monitor and then produced their continuations and used the response box to advance to the next trial. Participants' responses were recorded in Praat Version 4.5.15 (Boersma & Weenink, 1992-2007) at a sampling rate of 22050 Hz using a Samson QV head-mounted microphone.

Participants

All participants were Ohio State University undergraduate students. In all, twenty-five participants took part; twenty-four were intended, but an initially small recording buffer size

caused a loss of much of one participant's data, creating a need for an extra participant. Of the twenty-five participants, sixteen were students in introductory linguistics and psycholinguistics courses and were participating for course credit. The remaining nine were verbally recruited friends and acquaintances of the author. Upon completion of the experiment, all participants were debriefed with the applicable background information, the purpose of the experiment, and the hypothesized results.

Data Analysis

To begin the analysis, each response was coded for its status as a 'parallel' or 'nonparallel' continuation. This was done to allow for the independent consideration of 'parallel' responses, which by definition exhibited some form of direct contrast with the Prompt. To ensure that these responses did entail direct contrast, this study defined 'parallel' in relation to the Prompt's syntactic and information structures as well as the overall purpose of each discourse. In order to qualify as a parallel continuation, an utterance had to exhibit a simple SVO structure, and the thematic structure had to follow the pattern of 'Agent - Transitive Verb - Patient/Direct Object' as in each of the Prompts. Some canonical examples of these parallel structures are:

(8)	Prompt	DM	Continuation
	'Mary planted basil.	And then…	*she planted oregano.*
	'Molly replaced the cabinets.	Following that…	*Arnold replaced the floor.*

To qualify as exhibiting a parallel discourse purpose, the continuation had to contribute to the discourse topic from the Context in a way similar to the Prompt. For example, planting

oregano serves a parallel discourse purpose to planting basil in a discourse about gardening. Another example of structural and discourse parallelism is provided in (9):

(9) Before heading into the movie theater, Jenna and Wally stopped at the concessions stand. Considering many options, Wally chose popcorn.

And then…

Jenna bought a Payday.

In this case, the discourse purpose established by the Context and Prompt is to describe what Wally and Jenna bought at the concessions stand. By describing Jenna's purchase, the continuation serves the same discourse purpose as the Prompt.

Despite surface similarity to the Prompt, some continuations that exhibited an SVO syntactic structure and an Agent-V-DO thematic structure were rejected as parallel continuations due to their lack of parallel contribution to the discourse purpose:

(10) This spring, Mary and Adam finally started gardening. Early on, Mary planted basil.

And then…

Adam uprooted the basil.

In this case, the continuation exhibits SVO and Agent-V-DO structures and its contribution to the discourse involves gardening as does the Prompt's; however, uprooting basil does not contribute to a discourse about collaborative gardening in a way comparable to planting basil. Instead, this continuation violates normal expectations of discourse flow under the common goal suggested by the Context sentence; if both Mary and Adam are gardening together, why does

Adam impede Mary's work? Here it seems as though the participant's continuation was guided by what seemed an unlikely continuation of the discourse. Consider the following example:

(11) Before hanging the new curtains, Lara and Brian decided to clean the living room. First, Lara opened the window.
After that…
She jumped out the window.

Although this continuation does not exhibit parallel syntactic and thematic structures as in (10), it does provide a further example of the violation of discourse expectations through improbable continuation of the discourse. It is worth noting that certain participants produced a large number of this type of response while others rarely or never did so, suggesting it to be a participant-dependent response tendency. Because continuations of this nature seemed directed by a goal of violating discourse expectations rather than the explicitly instructed goal of continuing the discourse *according* to normal expectations, responses of this type were rejected as parallel continuations.

Not all responses failing to exhibit a parallel discourse purpose were a result of a violation of discourse expectations:

(12) When they saw that their house had been egged, Ryan and Andrea decided to clean up. Gathering the supplies, Ryan grabbed a rag.
And then…
They cleaned the house.

Here, the discourse does continue according to normal expectations. Still, the continuation does not contribute to the topic established in the Context in a way parallel to the Prompt. While the Prompt describes the gathering of supplies in order to clean, the continuation describes the act of cleaning itself. Note that although this continuation exhibits SVO and Agent-V-DO structures and does not violate discourse expectations, it does not involve direct contrast with the Prompt's subject, verb, or direct object. In these instances, considering discourse purpose in this manner avoided consideration of non-contrastive responses when analyzing the parallel continuations.

In other cases, the continuation's discourse purpose was parallel to the Prompt, but its surface structure did not strictly mirror that of the Prompt, causing it to be rejected as a parallel continuation. Consider the following example:

(13) After setting up their tent, Gary and Laurie started the BBQ. Before anything else, Laurie seasoned the meat.

And next…

She put the meat on the grill.

In this instance, the continuation exhibits a parallel discourse purpose; however, its syntactic structure involves two post-verbal arguments, as opposed to the single argument in the Prompt. Labeling these types of responses as non-parallel allowed for the independent analysis of responses that exhibited thematic structures mirroring that of the Prompt, facilitating the consideration of informational relationships between items sharing grammatical positions in both the Prompt and response. Although nonparallel continuations such as those mentioned above may provide further insight into the role of L+H* in evoking expectations of contrast, this

analysis is concerned primarily with parallel continuations in order to analyze the interaction of intonation and contrast within productions of direct contrast.

There were several cases in which determining parallel versus nonparallel status proved difficult. Consider the following example:

(14) When the power went down, Julie and Ben were cooking dinner. Unable to see, Julie dropped a plate.

And next…

Ben lit a candle.

In this case, the continuation exhibits parallel syntactic and informational structures, but its role in the discourse is marginally different than that of the Prompt. While the Prompt presents an unintentional action (i.e., an accident caused by an inability to see), the continuation presents an intentional action. This does not completely violate the discourse purpose, as the initial context sentence does not direct the elaboration of the discourse in a specific direction. However, Ben's action does not align with the discourse purpose of the Prompt, which describes the mere reaction of Julie to the blackout. In this case and others like it, the continuation was placed in a third group of ambiguous cases. These cases are not presented as parallel or nonparallel in the *Findings* section.

As mentioned above, the coding of continuations as parallel or nonparallel serves to indicate the continuations that exhibit explicit or direct contrast. With the consistent syntactic and thematic structures presented in the Prompts, any utterance that exhibits a parallel structure as it has been defined here exhibits some form of contrast with the subject, verb, or object of the Prompt, or some combination of the three (barring a verbatim reproduction of the Prompt). By

considering the parallel continuations apart from the rest, the analysis can focus on clear instances of direct contrast. Analyzing the predominance of parallel continuations in the presence of L+H* on the DM provides a view of how the accentual information of the DM may have induced notions of contrast, and looking for patterns within the parallel continuations gives a view of how the accentual pattern of the both the Prompt and DM influence the nature of contrast produced.

In addition to coding the parallel status of each continuation, the verbs and arguments within each continuation were coded individually for their information status within the discourse. This coding classified subjects, verbs, and post-verbal arguments as new, inferable, retained, or contrastive to their syntactic counterparts in the Prompt. This was done to examine how the accentual pattern of the Prompt and DM affected the position of contrastive and repeated information in the participants' responses. In this local coding, 'Retained' refers to any entity that was semantically identical to an entity in the Prompt, while 'Repeated' refers to an entity that was semantically identical to an item in the Context. 'New' refers to an entity that could not be assumed or inferred within the discourse context (e.g., 'a bird' in a discourse about cleaning a car). 'Inferable' refers to an entity that could be considered accessible or assumed to be part of the discourse context (e.g., 'the desk' in a discourse about children in a classroom). 'Contrastive' refers to any inferable entity that contrasted directly with an entity in the Prompt (e.g., 'oregano' in the discourse about planting basil in the garden). The classification system also marked 'Shift' items, which were repeated items from the Prompt that had shifted grammatical role (e.g., 'Randy told a colleague. And then…*the colleague watched it*.'). Table 5 contains each of the information tags used along with their corresponding meanings, sorted by subject, verb, and post-verbal argument tags.

Subject	Verb	Post-verbal Argument
RetN: lexically identical to Prompt subject	**RetV**: lexically identical to Prompt verb	**RetA**: lexically identical to Prompt argument
RetP: pronoun of RetN (i.e., 'he' or 'she')	**RetR**: synonym to RetV (e.g., picked ~ chose)	**RetP**: pronoun of RetA (i.e., 'it')
ContN: lexically identical to person from Context not mentioned in Prompt	**ContV**: contrastive action to Prompt verb	**ContA**: inferable argument contrastive to Prompt argument
ContP: pronoun of ContN	**InfV**: inferable but not contrastive to Prompt verb	**InfA**: inferable but not contrastive to Prompt argument
DP: pronoun of both people in Context (i.e., 'they')	**RepV**: action repeated from Context	**RepA/P**: noun/pronoun of item from Context
NewN: brand new subject not mentioned in discourse	**NewV**: non-inferable action new to discourse	**NewA**: non-inferable concept new to discourse
ShiftN: Prompt's object becomes subject		**ShiftA/P**: noun/pronoun of Prompt subject
InfN: any item in Context other than RetN or ContN		

Table 5: Information status tags used to classify items within each continuation

Findings

As detailed above, explicit contrast in participants' responses was often expressed through parallel continuation. The main hypothesis under investigation in this experiment is that L+H* produced on a DM leads to anticipation of contrast in the listener, which should then lead to a greater predominance of parallel continuations when the DM exhibits L+H*. With analysis of the full data set currently underway and the prosodic analysis yet to be undertaken, results from the informational analysis for the first twelve participants are presented here. The following analysis is thus based on 573 responses (96 for C1, C4, & C6; 95 for C2, C3, & C5)[2].

[2] We could not obtain three critical utterances from one subject due to limited recording buffer; these were one each from Conditions 2, 3 and 5.

First, a comparison between conditions with L+H* on the DM (C1, C3, and C5) and conditions with H* on the DM (C2, C4, and C6) shows no robust effect of the DM accentual pattern on the production of parallel continuations. Table 6 shows the totals of parallel continuations for the conditions with L+H* on the DM and for those with H* on DM. The occurrence of parallel continuations was comparable across the two prosodic condition groups: L+H* on the DM did not lead to a greater predominance of parallel continuations than did H*.

DM	# of Parallel Continuations
L+H* *And NEXT*	104
H* *And next*	99
TOTAL	203

Table 6: Parallel continuations across the two DM variations

The distribution of parallel continuations across the six conditions is presented in Table 7. Comparisons across each prompt type (P1: C1 vs. C2, P2: C3 vs. C4, and P3: C5 vs. C6) indicate that the presence of L+H* in the Prompt did lead to a greater frequency of parallel continuation. In the conditions without prosodic prominence in the Prompt (C1 & C2), participants produced a total of 60 parallel continuations. However, in the conditions with a prosodically prominent subject (C3 & C4), participants produced a total of 72 parallel continuations, and in the conditions with a prominent object (C5 & C6) participants produced 71 parallel continuations. This suggests that prosodic prominence in the Prompt did lead to a slightly greater tendency for participants' to produce direct contrast in their responses. However, comparisons within each Prompt type indicate that the hypothesized effect of L+H* on the DM was hinted at only in the discourses in which the Prompt had a contrastive accent in the direct object position (C5 vs. C6).

The current data for these two conditions show that participants produced parallel continuations more frequently when the following DM had contrastive L+H* (41) than when it did not (30). Since the difference between the two conditions is relatively small, and the relationship between the DM accentual pattern and the occurrence of parallel continuation is reversed for the Prompts with a prominent subject (C3 vs. C4), whether DM accent produces a consistent effect for specific Prompt types must be attested with a larger data set.

Accent Pattern Prompt → DM	# of Parallel Continuations
C1 *Mary planted basil. And **THEN**…*	30
C2 *Mary planted basil. And then…*	30
C3 ***MARY** planted basil. And **THEN**…*	33
C4 ***MARY** planted basil. And then…*	39
C5 *Mary planted **BASIL**. And **THEN**…*	41
C6 *Mary planted **BASIL**. And then…*	30
TOTAL	203

Table 7: Parallel continuations across conditions

Due to the overall low frequency of parallel continuation, systematic relations between the accentual patterns of the stimuli and the continuations were difficult to capture with simple counts of parallel continuations. However, closer analysis of the informational status of individual words across all continuations reveals interesting consistency within participants'

continuations. First, the informational status of the subjects, verbs, and objects in the continuations (parallel and non-parallel) were coded according to the criteria shown in Table 5 above. Then the occurrences of Contrastive and Retained information, whether expressed in an anaphoric or non-anaphoric manner, were counted for each word position. Table 8 summarizes the Contrastive and Retained counts for the subject, verb, and object argument positions for each condition. Note that Table 8 totals the Contrastive and Retained information across *both* the parallel and non-parallel continuations.

Accent Pattern	Contrastive Subject	Retained Subject	Contrastive Verb	Retained Verb	Contrastive Argument	Retained Argument
C1 *Mary planted basil. And **THEN**…*	41	33	12	27	31	10
C2 *Mary planted basil. And then…*	41	29	15	30	32	13
C3 ***MARY** planted basil. And **THEN**…*	45	27	12	30	31	16
C4 ***MARY** planted basil. And then…*	39	32	14	33	37	11
C5 *Mary planted **BASIL**. And **THEN**…*	39	37	8	34	34	9
C6 *Mary planted **BASIL**. And then…*	34	40	13	29	35	11
TOTAL	239	198	74	183	200	70

Table 8: Information totals for subject, verb, and post-verbal argument positions across conditions for all continuation types

The above table demonstrates a clear asymmetry in the distribution of Contrastive and Retained information in participants' continuations. First of all, Contrastive information

appeared most frequently in the subject position, followed by the object argument position. This indicates that participants made frequent mention of the Contrastive agent and/or a Contrastive object in their continuations. On the contrary, participants rarely used a Contrastive verb in their continuations. This may be an artifact of the experimental design, as there was no target Prompt that prosodically highlighted the verb. As for the Retained information, it appeared most frequently in the subject position, indicating that participants often continued the story with the same subject as in the Prompt (using the pronouns 'he' and 'she' more often than the full noun. The use of a Retained full noun was limited to 37 trials across the twelve participants, with 25 of those produced by two participants). Participants also used Retained verbs (including both lexically identical and semantically equivalent verbs to that in the Prompt) reasonably frequently in their continuations, while they mentioned Retained arguments far less frequently.

The distribution of Contrastive information in Table 8 does not seem to be related to the accentual patterns of the Prompt and DM. For the Prompt without L+H* (C1 & C2), a Contrastive subject appeared with a frequency comparable to that of the Prompt with an accented subject (C3 & C4). Contrastive arguments were used with near equal frequency for all three Prompt types. A weak relationship between the accentual pattern of the Prompt and the use of Retained information is hinted at for both the subject and object positions. Retained subjects occurred most often after Prompts with a prominent object (C5 & C6) and least often after Prompts with a prominent subject (C3 & C4). In addition, Retained arguments occurred most often after Prompts with a prominent subject and least often after prompts with a prominent object. Taken together, these patterns indicate that L+H* placement in the Prompt may have played a role in the production of Retained information, such that a prosodically highlighted item

in the Prompt led to less frequent repetition of that item as well as more frequent repetition of the item in the other argument position (e.g., highlighted subject → Retained argument).

In order to further examine the distribution of Contrastive and Retained information, their occurrences in the three grammatical positions were sorted by continuation type: parallel, non-parallel, and ambiguous (See the *Data Analysis* section above for the criteria for this categorization). Table 9 summarizes the raw counts of Contrastive and Retained information in the three grammatical positions and their proportional frequencies within each continuation type.

Continuation Type	Contrastive Subject	Retained Subject	Contrastive Verb	Retained Verb	Contrastive Argument	Retained Argument
Parallel (203 total)	125 (62%)	65 (32%)	25 (12%)	162 (80%)	171 (84%)	25 (12%)
Non-parallel (333 total)	94 (28%)	117 (35%)	35 (11%)	14 (4%)	16 (5%)	36 (11%)
Ambiguous (37 total)	20 (54%)	16 (43%)	14 (38%)	7 (19%)	13 (35%)	9 (24%)

Table 9: Information status totals for parallel, non-parallel, and ambiguous continuation types
(Note that the presence of new and inferable information allows for subject/verb/argument totals of less than 100%)

Table 9 demonstrates the informational structures of each continuation type. First, parallel continuations were frequently initiated by a Contrastive subject, which was predominantly followed by a Retained verb and a Contrastive argument. The use of Retained verbs and Contrastive arguments in parallel continuations were both robustly higher than in the other two continuation types. In non-parallel structures, a Retained subject appeared slightly more frequently than a Contrastive subject, but neither was used predominantly. (In these constructions, new nouns, shifted nouns, and plural pronouns (i.e., 'they') were frequently used.) The occurrences of Contrastive verbs and arguments and Retained verbs and arguments were

relatively low in non-parallel continuations. In the 37 ambiguous continuations, the subject was either Contrastive or Retained, and it is worth noting that Contrastive verbs appeared relatively more frequently than in the other two continuation types. Most commonly, a Contrastive verb was combined with a Retained argument (e.g., 'Lara opened the window. After that, …*she CLEANED it with Windex.*': Subject 8).

With the above analysis showing parallel continuations to exhibit the most consistent distribution of Contrastive and Retained information, and with all parallel continuations involving some form of direct contrast, we decided to further analyze the relationship between the distribution of Contrastive and Retained information and the preceding accentual patterns *within* the parallel continuations. Table 10 shows the proportional frequencies of Retained and Contrastive information in the three positions for parallel continuations across conditions.

Condition	Contrastive Subject	Retained Subject	Contrastive Verb	Retained Verb	Contrastive Argument	Retained Argument
C1 *Mary planted basil.* *And **THEN**…*	47%	37%	17%	80%	87%	13%
C2 *Mary planted basil.* *And then…*	70%	23%	17%	83%	87%	10%
C3 ***MARY** planted basil.* *And **THEN**…*	82%	18%	12%	82%	76%	18%
C4 ***MARY** planted basil.* *And then…*	56%	31%	15%	82%	87%	13%
C5 *Mary planted* ***BASIL**.* *And **THEN**…*	51%	46%	7%	76%	76%	15%
C6 *Mary planted* ***BASIL**.* *And then…*	67%	33%	7%	77%	97%	3%

Table 10: Proportional frequencies of Retained and Contrastive information within parallel continuations.

Although the difference in the accentual pattern of the DM did not seem to affect the informational distribution after the Prompt without prosodic prominence (C1 & C2), the effect of DM accent was found for the relevant word positions after the other two Prompt types. First, when the subject was highlighted with L+H* in the Prompt, participants produced the Contrastive subject more frequently after the DM with L+H* (C3: 82%) than after the DM with H* (C4: 56%). For both conditions a Retained verb and Contrastive argument were dominantly used, though the Contrastive argument was used more frequently when the DM was not prominent (C4). When the DM did not carry a contrastive accent (C4), the use of Retained subjects increased, whereas a Retained argument was less frequently mentioned as compared to the condition with a contrastive DM (C3). In sum, a contrastive accent on the DM after the Prompt with a prominent subject seemed to evoke the predicted contrast in the subject position while also increasing the use of Retained arguments.

Contrastive accent on the DM after the Prompt with a prominent argument (C5 & C6) did not exhibit an effect comparable to that above. Instead, it induced a reduction of Contrastive arguments and an increase of Retained arguments as compared to the non-prominent DM, demonstrating the opposite function of accentuation. Note that the use of a Retained subject was relatively higher in both conditions after the Prompt with prominent argument than in the other conditions. In both conditions, participants used a Retained verb predominantly. Contrary to prediction, when the DM had L+H* (C5), a Contrastive argument was mentioned *less* frequently than when the DM had a less prominent H*. In fact, the relative frequency of Contrastive argument was the lowest in this condition. In addition, the frequency of Retained argument was relatively high in C5. These were truly unexpected results. Interestingly, when the DM was *not* prominent (C6), nearly all parallel continuations included a Contrastive argument. This indicates

that evoking Contrastive information for the object argument position was better mediated by a non-prominent DM than by one produced with contrastive accent.

In sum, the analysis of Contrastive and Retained information distribution within parallel continuations reveals an interesting interaction between the Prompt prosodic structure and the prosodic prominence of the DM. It appears that a prominent DM evokes mirroring informational construction when the subject of the Prompt is prosodically highlighted, but it instead blocks this construction after a Prompt with a prominent argument. In other words, DMs with certain accentual properties seem to contribute to discourse construction differently according to the prosodic focus of the preceding utterance.

Discussion

Although analysis of the full data set is underway, preliminary results from twelve participants suggest several interesting consistencies in their spontaneous discourse continuations. In particular, the relationship between the prosodic pattern of the discourse context and the accentual pattern of the DM has proven to be more complex than was originally hypothesized. Although contrastive L+H* accent on the DM was expected to evoke parallel continuation mirroring the information structure of the preceding utterance, it exhibited opposing functions in guiding the use of Contrastive information in the two grammatical positions of subject and object argument. First, when the subject of the Prompt was highlighted with L+H*, a following prominent DM led to more frequent use of the Contrastive subject and relatively more frequent use of a Retained argument. When the Prompt exhibiting a prominent subject was followed by a non-prominent DM, participants used a Retained subject relatively more frequently. Therefore, for contrast in the subject position, the accentual emphasis on the DM

served as a facilitative or contrast-enforcing cue as predicted. For the contrast in the object argument position, however, a prominent DM seemed to intervene in the mirroring of the informational structure from the Prompt sentence. After the Prompt with a prominent argument, participants mentioned a Contrastive argument more often when the continuation was mediated by a non-contrastive DM. When the DM carried L+H*, the mention of Contrastive arguments decreased, and participants instead mentioned Retained arguments more frequently.

The findings about the context-dependent function of L+H* accent on a DM are novel and interesting. Here, at least two possibilities can be speculated as to how the observed patterns emerged. On one hand, the results suggest that L+H* on a DM has multiple functions in discourse structuring. This is simply to say that a contrastive L+H* on a DM chains the contrast in the subject position but blocks such an informational chain for the object position. On the other hand, it is also conceivable that L+H* in different grammatical positions in preceding sentences may lead to different expectations about the following discourse structure. That is, while L+H* in the subject position may lead to an anticipation of a contrastive entity as the topic or theme of the following sentence, L+H* in the internal argument position (i.e., embedded in the rheme of the proposition) may highlight the salience of that discourse entity against other alternatives, leading to the expectation that the following sentence's proposition will deal with the same entity. If there is such expectation tuning with L+H* according to the thematic role of the accented word, a following contrastive L+H* on the DM may indeed reinforce the expectation for each case: namely, mention of Contrastive information in the subject position and the preservation of Retained information in the object position. In short, the former account proposes the difference in processing at the DM, with subject contrast being reinforced and object contrast being blocked, whereas the latter accounts for the difference during the

processing of the prior utterance itself. In order to further entertain these two possibilities, participants' interpretations at different time points during discourse progression must be investigated with an online measurement. Eye tracking is a suitable technique for detecting expectation preferences in discourse context, and an experiment utilizing a scene-depiction paradigm is under planning.

Although the present results may be explained by one of the accounts presented above, the overall discrepancy in the frequency of Contrastive information between the subject and object positions may have come, at least partially, from the particular design of the present experiment. As shown in Table 8, a Contrastive or alternative subject appeared more frequently (239) than a Contrastive argument (200) in participants' continuations across conditions. Furthermore, the occurrence of a Contrastive subject was higher after the Prompt with a prominent subject (C3 & C4: 84) than after the Prompt with a prominent object (C5 & C6: 73), while the overall occurrence of Contrastive arguments after the Prompt with a prominent object (C5 & C6: 69) was approximately equal to that after the Prompt with a prominent subject (C3 & C4: 68). Again, the difference shown here may be due to the functional difference of L+H* in the subject position versus in the object position. Note, however, that the informational salience of the subject was not equal to that of the object in the Prompt. That is, the subject was always one of the two names mentioned in the initial Context sentence, whereas the object entity was mentioned for the first time in the Prompt, making the accented subject highly more salient than the accented object. When one of the two aforementioned names was highlighted by L+H* in the Prompt, participants may have been prompted to access the other already-mentioned name and use it as the agent of their continuations. On the contrary, when participants decided to use a Contrastive argument, they had to explore the possible alternative discourse entities that would

express a logical contrast with the just-mentioned object. Presumably, selecting an already mentioned contrastive discourse entity (i.e., the Contrastive agent) is easier than selecting a contrastive entity among a set of alternatives (i.e., some Contrastive argument) as the object of a spontaneously chosen action. Therefore, under the present experimental setup, it is highly likely that the subject-highlighting Prompts evoked more readily accessible Contrastive candidates than the object-highlighting Prompts, leading to the observation of more frequent mention of Contrastive subjects than Contrastive arguments.

Although there was a noticeable pattern in the information structure of parallel continuations across participants, there is a wide amount of variability among participants in regard to their choices of information structure. For example, two of the participants produced 25 and 29 parallel continuations apiece, while the remaining ten produced an average of only 15. The number of continuations exhibiting a Contrastive subject varied between 8 and 42 across participants, with additional variation among the ten participants who produced a number between these two extremes. Likewise, the number exhibiting a Retained verb varied between 8 and 24 across participants. This is comparable to the variation in Contrastive arguments: between 11 and 26. These results suggest that some individuals were more prone to produce direct contrast than others, possibly independently of the accentual pattern of the stimuli. Altogether, the amount of variation among the twelve participants shows that individual continuation strategies played a role in the data patterning overall. For example, some participants attempted to remember the two names and use the alternative name in their continuations regardless of the prosodic condition, while others failed to remember the two names and thus strategically used pronouns predominantly across conditions. Given such

participant-dependent tendencies, analysis of all participants' responses must be completed in order to confirm the reported continuation patterns.

An explanation for the data patterning that is not entirely a participant-dependent factor is the semantic variability across the stimuli. Some stimuli were far more prone to the production of direct contrast, and therefore parallel continuation, than others due to the salience of contrastive entities within their discourse contexts. For example, the following item exhibited Contrastive arguments for all twelve participants (with parallel continuation for ten of twelve participants):

(15) Following dinner, Al and Gail stopped at the ice cream shop. After waiting in line, Al ordered vanilla.

After that…

For this particular item, ten responses involved Gail ordering a contrastive flavor of ice cream (the two non-parallel continuations mentioned something going wrong with Al's order). Presumably, the range of actions under this discourse purpose is limited mainly to ordering ice cream of different flavors, biasing the continuations toward a structure parallel to the Prompt. Although the placement of accentual focus in the Prompt and DM of this item included all six variations across the twelve participants, the responses remained overwhelmingly parallel.

While some items consistently prompted direct contrast, as exemplified above, other items often failed to evoke contrast, regardless of their accentual patterns. Consider the following:

(16) With the tornado siren sounding, Rose and Greg prepared to take cover. In a hurry, Greg entered the basement.

And then…

This item is biased toward a lack of direct contrast in the object position of participants' responses, for where else in a house might one enter when taking cover during a storm. Aside from one participant who responded with 'Rose jumped into the tub,' no one produced argument contrast on this trial, and less than half involved subject contrast. Other than the stated exception, the parallel responses in this case were limited to 'Rose entered the basement' (two of twelve responses).

With stimuli items that neither heavily restrict the continuation structure nor restrict the potential contrast with inferable discourse entities, we may obtain various responses that allow for the examination of the prosodic effect under investigation. Consider the following item:

(17) Before selling their old Civic, Dewey and Anna took the whole day to clean it. When they were nearly finished, Anna wiped the dashboard.

And then…

This item did not necessarily bias toward parallel continuation (responses included five parallel continuations and seven nonparallel continuations). In addition, there are several salient object contrasts within this discourse context (e.g., windows, wheels, tires; all taken from actual responses). For several responses to this particular item, production of direct contrast within parallel structures did exhibit the predicted interaction with the accentual pattern of the Prompt and DM: Participant 3's continuation in C3 (subject and DM prominence) mentioned Dewey,

and the continuations by Participants 7 and 8 in C5 & C6 (object prominence), respectively, both involved contrast with the object, with the response to C5 exhibiting a Retained subject. The responses to this item indicate that properly controlled stimuli do have the potential to uncover the effect under investigation.

In order to confirm the effect of accentual patterns on discourse structuring, a follow up study with a more carefully controlled stimuli set is necessary. To eliminate biases on the use of contrastive discourse entities, we must prepare Context sentences that include both the two agents and the two object argument candidates of the following actions, thereby making the contrastive entity of a prosodically prominent object in the Prompt equally salient to the contrastive entity of a prosodically prominent subject. The results of this follow-up study should lead to clearer understanding of the effect of the prosodic properties of preceding utterances on discourse construction and should then yield clearer predictions regarding the online discourse comprehension mechanism, which will be tested using the eye tracking technique.

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Appendix

Discourse Completion Items

Context	**Prompt**	**DM**
Before hanging the new curtains, Lara and Brian decided to clean the living room.	First, Lara opened the window.	After that
To get ready for their grandma's birthday party, Bob and Lily went to the supermarket.	Once inside, Lily grabbed the cart.	After that
A week before the trip, Melanie and Roy went to the library.	At the front desk, Melanie requested a novel.	And next
When they got home after the long meeting, both Fred and Angela were hungry.	Before doing anything else, Angela ate a sandwich.	And next
This spring, Mary and Adam finally started gardening.	Early on, Mary planted basil.	And then
When they moved in, Darrel and Amy couldn't sleep because of the noise from the neighbor.	First, Amy tried earplugs.	And then
For the first time in their lives, Donna and Bill stayed in a 5-star resort hotel.	Soon after lunch, Donna visited the spa.	Following that
To renovate the kitchen, both Arnold and Molly spent a lot of money.	Initially, Molly replaced the cabinets.	Following that
Three months prior to the competition, Daniela and Lenny decided to lose weight.	Right away, Daniela joined the gym.	After that
After setting up their tent, Gary and Laurie started the BBQ.	Before anything else, Laurie seasoned the meat.	After that
When they came back from a long walk through the snowstorm, Marilyn and Will were both freezing.	Immediately, Marilyn got a blanket.	And next
During their summer vacation on the lake, Brady and Renee went to the coffee shop every morning.	As part of the routine, Renee read the newspaper.	And next
Despite all the troubles at the security gate, Evelyn and Doug got on board in time.	Quickly, Evelyn found a seat.	And then
Before selling their old Civic, Dewey and Anna took a whole day to clean it.	When they were nearly finished, Anna wiped the dashboard.	And then
Once the puppy was missing, both Darla and George went crazy.	Without hesitation, Darla called the pound.	Following that

Context	Prompt	DM
Throughout the presentation, Barney and Lena could not remain silent.	Making strange noises, Lena distracted the audience.	Following that
By the time they arrived in Boston, both Adriana and Dylan were seriously ill.	Because of an upset stomach, Adriana skipped dinner.	After that
While they waited for the train, Don and Marge planned their activities for the day.	Wondering what to do, Marge considered the park.	After that
When the power went down, Julie and Ben were cooking dinner.	Unable to see, Julie dropped a plate.	And next
On the way back from their regular evening walk, Norman and Zoe found a handbag on the bench.	Examining the contents, Zoe found a wallet.	And next
Their first time in Appalachia, Gena and John lost their way back to the trail.	With the treetops covering the sun, Gena examined the compass.	And then
After the concert ended, Daniel and Mandy went to the band's merchandise table.	Without much to spend, Mandy bought a poster.	And then
During the match, neither Emily nor Dave were permitted to speak.	Wondering the reason for this, Emily consulted the rules.	Following that
Right before the storm, Donovan and Naomi cleared the porch.	With the clouds approaching, Naomi moved a chair.	Following that
Before choosing their new home, Nora and Drew toured many houses.	In the first house, Drew explored the kitchen.	After that
Following dinner, Al and Gail stopped at the ice cream shop.	After waiting in line, Al ordered vanilla.	After that
Not knowing that the principal was watching through the window, Maggie and Rob made a huge mess in the classroom.	In a fit of energy, Rob threw the chalk.	And next
Coming out of the building, Jim and Elenora saw a truck hit a pedestrian.	Right away, Jim called the ambulance.	And next
With the tornado siren sounding, Rose and Greg prepared to take cover.	In a hurry, Greg entered the basement.	And then
When they saw that their house had been egged, Ryan and Andrea decided to clean up.	Gathering the supplies, Ryan grabbed a rag.	And then
On their class field trip, Rena and Gerald went to the petting zoo.	Having never been good with animals, Gerald angered the pig.	Following that

Context	Prompt	DM
Despite the agreement on the chores, Damien and Meredith could not keep up with the housekeeping.	To turn things around, Damien washed the dishes.	Following that
Irritated by the bad service and the rude waiter, Olivia and Lloyd decided to complain.	First, Lloyd confronted the manager.	After that
As soon as they heard the announcement, Edgar and Linda decided to evacuate.	Ready to leave, Edgar got the car.	After that
Before heading into the movie theater, Jenna and Wally stopped at the concessions stand.	Considering many options, Wally chose popcorn.	And next
When their computer crashed, Larry and Anne decided to fix it themselves.	After turning off the power, Larry unplugged the monitor.	And next
Dealing with so many customers daily, Deborah and Albert secured some quiet time.	Right away, Albert opened a book.	And then
While hiking through the woods, Judd and Louise came upon a beautiful sight.	Peering through some binoculars, Judd saw the lake.	And then
Upon hearing static come from the speakers, Ellen and Bernard knew something was wrong with the radio.	Initially, Bernard checked the antenna.	Following that
Arriving at the new music shop, Bud and Emma were excited to see what was inside.	Being a jazz lover, Bud selected a saxophone.	Following that
After arriving at the beach, Julia and Ron decided to take a swim.	Before jumping in the water, Ron grabbed goggles.	After that
Always superstitious, Reggie and Nina performed a ritual before the hockey game.	To begin the ritual, Reggie kissed the puck.	After that
Recording the rock album, Wendy and Brendan composed a new song.	First, Brendan wrote the vocals.	And next
Having just bought a horse, Gil and Barbara decided to build a fence.	While purchasing the materials, Gil carried the wood.	And next
Having never laughed harder, Myra and Randy alerted everybody of their new favorite comedy.	Right away, Randy told a collegue.	And then
At the wedding, Danny and Jill knew almost every one.	After the ceremony, Danny greeted the bride.	And then

Context	Prompt	DM
Standing on the deck of the cruise ship, Amelia and Wade enjoyed the view.	Looking across the water, Wade saw an island.	Following that
With their son going back to school, Jerry and Lauren went to the store to buy supplies.	First, Jerry grabbed a notebook.	Following that